

DOCKETED

IN THE UNITED STATES DISTRICT COURT FOR THE
SOUTHERN DISTRICT OF NEW YORK

MIDWAY MANUFACTURING COMPANY: Deposition of
vs. : William T. Rusch
THE MAGNAVOX COMPANY : Second Day
and : 74 Civ 1657 CBM
SANDERS ASSOCIATES, INC. :

IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION

THE MAGNAVOX COMPANY, et al : Consolidated Actions
vs. :
BALLY MANUFACTURING : 74 C 1030
CORPORATION, et al : 74 C 2510
H. STUART CUNNINGHAM, CLERK : 75 C 3153
UNITED STATES DISTRICT COURT : 75 C 3933

Continued deposition taken
pursuant to subpoena and notice at the Sanders Associates,
Inc.; Headquarters, Spit Brook Road; Nashua, New Hampshire;
Tuesday, February 24, 1976; commencing at ten o'clock in
the forenoon.

ERNEST W. NOLIN & ASSOCIATES
General Stenographic Reporters
369 ELGIN AVE., MANCHESTER, N. H. 03104
TELEPHONE: 623-6906

PRESENT:

For Midway Manufacturing
Company, Bally Manufacturing
Corporation and Empire:

Donald L. Welsh, Esq., 135 South
LaSalle Street, Chicago, Illinois.

For Sanders Associates, Inc.,
and Magnavox Company:

James T. Williams, Esq.,
77 West Washington Street,
Chicago, Illinois.

For Sanders Associates:

Richard I. Seligman, Esq.,
Daniel Webster Highway, South,
Nashua, New Hampshire.

Stenotype Reporter:

Ronald J. Hayward

WILLIAM T. RUSCH

called as a witness, having been previously sworn, was
further examined and continued his testimony as follows:

(Interrogatories by Mr. Welsh.)

MR. WELSH: I'd like to remind
you, Mr. Rusch, that you are still under oath and
it won't be necessary to swear you in again.

Mr. Williams, were you able during the recess to

Don't have rights to look at and while the right
confronting him (may be the same stenographer who wrote the report)
numbers. WTC 76

determine from the employment records at Sanders

A. when Mr. Rusch went to work for Mr. Baer?

Q. When you went to work for MR. WILLIAMS: We have checked with Sanders' employment records on Mr. Rusch and

A. those records show that the effective date from

Q. Mr. Rusch's transfer to Mr. Baer was July 10, 1967.

Q. Did you do any work with Mr. Baer on TV games prior

A. to your transfer to work for him on July 10, 1967?

A. I probably thought about it as this memo we looked

at last week shows. you refer to that now and determine

Q. That is Exhibit 9-44 through 9-50? * is you first went

A. Yes, and I may have actually moved upstairs with

him and started working on this somewhat before the

A. date shown in the personnel records. Sometimes they

take a few weeks to catch up with someone. less

Q. Then prior to going to work for Mr. Baer, you were

Q. in a different location than after you went to

A. work for him? a few days before I went with him,

A. Yes. Well, actually, on 4-7-67 I have a note for a

Q. Where did you work prior to going to work for him?

A. I was on the second floor of the Canal Street

building. miscellaneous thoughts. On 7-31, a

Q. And where did you work after you went to work

* Don't have exhibits in front of me while
correcting this (May '76); assume stenographer wrote the right
numbers. WTC 5/24/76

Q. with Mr. Baer? What?

A. On the 6th floor. Want me to go through every page?

Q. When you went to work for Mr. Baer, did that work involve anything other than TV games? Time you went

A. During the course of my stay with him, yes.

Q. When you first went to work for him, did you work on anything other than TV games? ... in my spare

A. No, I don't think so. Complete record of everything

Q. Now, you referred to a notebook of yours before, Exhibit 17; could you refer to that now and determine what you were working on at the time you first went

to work for Mr. Baer? I believe the personnel to date, at least, was July 10, 1967. quadrupler of

A. I can't really tell from this exhibit. It appears that these were still just miscellaneous ideas being I was jotting down at the time.

Q. And what date of entry are you referring to?

A. Oh, I see here a few days before I went with him, officially, at least, on 7-7-67 I have a note for a frequency doubling guitar pickup. And on 7-25 a squarer circuit. On 7-27, a frequency quadrupler and some miscellaneous thoughts. On 7-31, a broad band 90-degree phase splitter. 17, there is a

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- Q. What page was that? (TV pickup for guitar and on
- A. Page 58. Do you want me to go through every page?
- Q. No, the question I believe was, you know, what were you working on shortly after - at the time you went to work for Mr. Baer and shortly after? It or project?
- A. I can't really tell from this notebook whether to these were just ideas I jotted down in my spare time. They are not a complete record of everything that I did at the time. As I recall, my main work did involve at least thinking about the TV games at that time.
- Q. Was your work on the squarer which you referred to on July 25, '67, and the frequency quadrupler of July 27, and the broad band phase shifter on July 31 included among the work that you were doing under Mr. Baer?
- A. I would say yes to the extent that I was also looking for more possible commercial products to exploit, that being one of the reasons I went to work for Mr. Baer; and it appears that many of these rather random ideas were done toward that end.
- Q. I have a usefulness in connection with your
- Q. Now, referring to page 43 of Exhibit 17, there is a

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A. notation of a capacity pickup for guitar and on the next page, 44, dated March 8 of '67, there was a notation of frequency doubling by the use of capacity pickup; was that work with respect to guitar done under any specific assignment or project?

A. No, these were just random ideas that happened to come to me and I would write them down in case any of them ever became useful. *Spelling*
with
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Q. And this, of course, that March date, was pretty well prior to the time you went to work for *Spelling* Mr. Baer? *with*
half
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A. I believe so. It also tried to double the frequencies

Q. Now, your notes with respect to guitar appear to continue on into August, referring to page 62,

Q. for example, is that correct? you did while under

A. Yes. Baer?

Q. And is the doubler referred to on pages 66 and 67

Q. a part of the guitar work? Harrison at that time?

A. I think not primarily, it was just an electronic technique I was exploring. It might have been a

A. better way to double any sine wave, any signal.

Q. Did it have a usefulness in connection with your guitar work?

A. Not really. And a fast perusal of it, it indicates
Q. that it is a scheme that I didn't eventually use
A. in the guitar device. circuits, test them.

Q. Did you carry your guitar work forward to any as or
conclusion? so record actual projects that you were

A. Yes. ing on?

Q. What was that?

A. A device was constructed that would have the

frequency of guitar notes and / or notes from other
A. instruments such as saxophones, flutes, trumpets,

Q. etc. I might add that was the primary feature of the
that device. It also tried to double the frequencies
in a very straightforward manner, but the dividing
by two was the main unique feature, as I see it. lect

Q. And that was a project that you did while under
Mr. Baer? was the first one he was able to find

A. Yes. a quick perusal of the exhibit.

Q. Were you working with Mr. Harrison at that time?

A. Yes. course.

Q. In the same location physically? you were working

A. Yes. the TV games prior to that time, is there any

Q. Did Mr. Harrison have anything to do with the
guitar work? TV games? Did something happen, in

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halve

A. Yes. ... at the time that he then commenced -

Q. What did he have to do with that? Did anything

A. He helped build the circuits, test them. ...

Q. Did you use your notebooks just to record ideas or

A. did they also record actual projects that you were

Q. working on? ... to Exhibit 9-44 through 9-50, those

A. I'd say both. ... are they not, of an original which

Q. And was that true with respect to the guitar? ...

project? ... other page of 9-51 through 53 is simply

A. Yes. ... page.

Q. Now, I believe we noted at the last session that the first entry with respect to TV games was on page 95

Q. of Exhibit 17? ... 9-44 through 9-50 was brought to

your attention just MR. WILLIAMS: the Well, I object

to the question. ... I think that the testimony was then

that that was the first one he was able to find

with a quick perusal of the exhibit.

A. No. ... MR. WELSH: Yes, I think that

Q. is accurate. ... further recollection as to why the

Q. Now, you state that you think that you were working

A. on the TV games prior to that time, is there any,

reason why there were no entries in Exhibit 17 relating

relating to TV games? Did something happen, in

other words, at the time that he then commenced - the date of that page is 9-25-67. Did anything happen at that time to cause you to commence making TV game entries?

A. I don't recall anything special happened, no.

Q. Referring back to Exhibit 9-44 through 9-50, those pages are copies, are they not, of an original which has been marked as Exhibits 9-51 through 9-63? I think every other page of 9-51 through 63 is simply a blank page.

A. Yes, without reading both thoroughly, that one appears to be a copy of the other, that would be Ralph Baer,

Q. Now, the document 9-44 through 9-50 was brought to

A. your attention just at the end of the last session of your deposition, have you had occasion since then

A. to review the circumstances under which this document was prepared by you?

A. No. he have anything to do with TV games?

Q. Do you have any further recollection as to why the document was prepared?

A. As I thought I said last Thursday, I guess it was, I believe Ralph had told me of his idea for putting games on a television set or other display and I

had been thinking about that and these ideas had come to mind and I jotted them down on paper and sent them to him in hopes that they might be helpful to him in the project. If it makes any difference, I don't think I was officially reporting to him at the time as we saw from the personnel records. In the past, I had done that. If I had ideas that I thought might be helpful to other groups, I would give them to them seeing we all worked for the same company.

Q. At the end of this document on page 9-50 is a distribution from R. Baer, that would be Ralph Baer, I presume, is that correct?

A. I assume so.

Q. Who was J. Mason?

A. That is a John Mason; he worked in Mr. Baer's department.

Q. Did he have anything to do with TV games?

A. I am not sure. This would indicate that he had being I sent him a copy of this, but I don't really remember. I can say after I went upstairs with Mr. Baer, I don't think John Mason had much to do with TV games, as I recall.

Q. Do you recall anything he had to do with them?

A. Yes, he was supervisor of my old ^S special ^C circuit^s.

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section which I had years ago and I believe at

the time Bill Harrison worked for John Mason.

Q. So at that time Harrison was not officially assigned under Mr. Baer? or with some creative thinking.

A. Well, John Mason was in Ralph's department, too,

I think Mr. Harrison reported to John Mason, but

A. that was a long time ago; I may be wrong about that, in my home set.

Q. On the distribution list of Exhibit 9-50 appears

R. Solomon. Who was R. Solomon?

A. I can't really recall. I have a strange feeling

Q. he might have been a technician who would have

been involved in the initial stages of this project,

A. but I can't really remember.

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Q. Referring to Exhibit 9-44, under paragraph No. 4

entitled "Chase Game," it says, "Use ships, dots or probably best two old 'dogfighting' type WWI planes or up-to-date plane and missile or ship and torpedo. One operator moves 'target' other pursues ...

When 'hit' by contact with pursuer, target vanishes."

Was that game as expressed there your idea? really?

A. I believe so.

Q. Did you have in mind any means by which ships, dots or the other images might be displayed?

A. I didn't have any circuit diagrams in mind, but I certainly assumed that it could be done with the

state of the art or with some creative thinking.

Q. Prior to that time, had you had any experience working with television sets?

A. Not really other than changing a tube once in a while in my home set.

Q. You had had some experience with cathode ray tubes, however?

A. Yes.

Q. I believe you said you worked on some deflection

amplifier?

A. Yes.

Q. Prior to the time you prepared this memorandum, 11,

what were you aware of that had been done previously

by Mr. Baer or anyone working with him in the

TV game area?

MR. WILLIAMS: If you recall,

Mr. Rusch.

THE WITNESS: I am not really

(what)
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sure at this time. I can't remember whether I even was in that room, the locked room we had where this work was going on. I am not sure that I had even seen this thing before I reported to him. I may or may not have.

Q. Prior to your preparation of this memo, what games did Mr. Baer tell you were being contemplated for television?

A. I believe he had some kind of a pumping game. The player would pump a lever and try to make a column fill up on the screen or something like that. He may have had the gun-shooting game, but I don't recall whether I knew about that before this Exhibit 9-44 was written or not.

Q. Did he tell you about any game or idea in which a dot was moved about on the screen of the TV set?

A. MR. WILLIAMS: If you recall, Mr. Rusch.

Q. Referring to Game No. MR. WELSH: Counsel, I think the witness is testifying from his recollection without being reminded continuously by you.

MR. WILLIAMS: I think the questions are improper as lacking an adequate

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foundation. Rather than objecting, I just think it should be made clear on the record what the question is. If you prefer, I can object to the question.

THE WITNESS: Would you repeat the question, please? I am asking if that case was his idea.

(Whereupon, the previous question was read back of the features that are shown in paragraph 1 of the report.)

THE WITNESS: At what time period are we talking about right now?

Q. We are still talking about the time period prior to your preparation of this document, Exhibit 9-44 through 9-50 which bears the date of May 10, 1967.

A. It is quite possible that he did.

Q. Do you recall?

A. I don't remember exactly, no.

Q. Referring to Game No. 16 on Exhibit 9-48 which has the title "hare and hounds" game, was that game your idea?

MR. WILLIAMS: Well, I object to the question as being vague. You used the term

that game, I am not sure whether you mean with
all the features that are elicited in that paragraph
16?, etc.; but the No. 16 you asked about doesn't
ring the same bell in MR. WELSH: I don't believe I
limited it to any. - - - There is a single game
referred to there and I am asking if that game was
his idea.

Q. Referring to the Game MR. WILLIAMS: Including all
of the features that are shown in paragraph 16?
did you contemplate MR. WELSH: The question is
clear, I believe, unless the witness has a question
prompted by your question. "If the car went
off the road, did you THE WITNESS: I am not sure.

Q. Is any part of that game as set forth there your
idea? MR. WILLIAMS: Well, I object.

A. I don't remember whether that particular one was
my idea or whether it may have come in conversations
with Ralph. Some of these I recognize or I remember
as being my ideas. For instance, No. 9, the
baseball guessing game; No. 10, the skill game;
No. 6, rotating spiral. I believe No. 18, roulette;
No. 5, maze game; No. 2, car steering; No. 11, the
map game, I believe; No. 13, baseball skill game.

I believe 21, the horseracing; definitely No. 20, golf putting. I believe No. 18, soccer, hockey, polo, etc.; but the No. 16 you asked about doesn't ring the same bell in my memory as some of these other ones. It is possible that I invented it or thought of it. It is possible that I didn't; I don't remember. One road and does something happen

Q. Referring to the Game No. 2, car steering, which was among those you considered to have been yours; did you contemplate that anything would occur when the car was not on the road? It states, "The player tries to keep car on the road." If the car went off the road, did you contemplate anything would happen? contemplated something happening when the car in No. 2 ran off MR. WILLIAMS: Well, I object,

to the question as being vague. There appears to me to be at least two separate games there in paragraph 2 of Exhibit 9-44 and you haven't stated to which one the question refers. anything

happening if the player MR. WELSH: In the description, he just refers to having steering wheel, put car on screen, movable road, player tries to keep car on road. There is only one road referred to. would

it be to implement to MR. WILLIAMS: Then it goes on, or show view through car windshield.

Q. What must you have contemplated? MR. WELSH: That is just how the road is viewed. You still contemplated only one road, did you not, Mr. Rusch?

Q. What happened? THE WITNESS: Well, there are two questions. One road and does something happen when the car goes off the road or roads. I may have contemplated something happening when the car went off the road in that in some of these, for instance, 7, I mentioned having different colored cars. If car in rear runs into car in front, the rear offending car disappears and other one wins, so I may have contemplated something happening when the car in No. 2 ran off the road; but, as you can see, I didn't write it down at the time specifically under No. 2.

Q. Do you recall specifically, with respect to Game No. 2 whether you contemplated anything happening if the player failed to keep the car on the road? A. It was my idea, but I am not 100 percent

A. I would think so, I certainly must have contemplated it. The question probably was, How expensive would

it be to implement that part of the function as well. that the car disappear if it hit the track

Q. What must you have contemplated?

A. Something happening when the car ran off the road.

Q. Did you have anything particular in mind as to

A. what happened? and the edge of the track caused the

A. Well, that was nine years ago; I can't say exactly

Q. what I had in mind. I would say now I would on the

contemplate either a player visually seeing that the

car went off the road or perhaps his opponent would

A. see that and say, look, buddy, your car went off

C. the road, you lost; or electronically you could

have bells ring or lights flash or the car disappear

A. or various things happening. Perhaps I should

Q. change my word "must" and say that I might have

A. contemplated these things. I probably contemplated

them. ~~Yes, I did on the first game.~~

Q. With respect to Game No. 7, the racing game, was

that also your idea? I don't believe you listed

Q. it with the others; ~~but on "Photo" it was listed with~~

A. I believe it was my idea, but I am not 100 percent

A. sure of that. ~~Obviously that involves an electronic~~

Q. In that game, it says, "two players" if car hits

track boundaries, it disappears. Was that your idea that the car disappear if it hit the track boundary?

A. Probably, but I am not sure.

Q. When you used the term "hits," what did you mean?

A. When the car and the edge of the track occupy the same place at the same time.

Q. You mean the images of the car and the track on the television screen occupy the same space at the same time?

A. Yes.

Q. Is there any other term that you have used to describe that occurrence?

A. When?

Q. At any time?

A. I think we may have at some time or other called it coincidence. Yes, I say on Exhibit 9-48 under Item 16, "hare disappears when hound and hare positions coincide."

Q. Is that what you meant by "hits" in connection with the description of the maze game No. 5?

A. Yes, because obviously that involves an electronic generated line of the maze rather than just an

overlay on the top of the screen. more than two

Q. Did you also contemplate an electronically with
generated road with respect to Game No. 2?

A. Yes, I quite probably did because I used the
phrase "movable road." *WTR 5/24/76 to clarify meaning*

Q. With respect to Game No. 7, did you contemplate an
electronically generated track image on the TV And
screen? *the next sentence says, when the display ball*

A. Yes, I believe so. *by one of the men on the*

Q. Did you have any specific circuitry in mind for
generating the track or the maze in these games at
the time you prepared this document? *ified so the*

A. No specific circuitry, but I assumed it could like
be done. *ball or a pass puck, and I assume that*

Q. Referring to Game 18 entitled "Soccer, Hockey, Polo,"
etc.; would you describe what you contemplated with
respect to those games? *st-thought was to allow the*

A. Well, apparently I contemplated just about what is
written here on Exhibit 9-49. Each player would
control several men, each of which could be positioned

Q. by a joy stick. Sentence 2 says that if only two
people are playing the game, each would control it
two men by using a joy stick in each hand. And the

next sentence says, if there are more than two players, each could control either one man with

one hand or two men with two hands. The idea apparently being to get more than just two men on the screen (as we later used in ping pong and tennis) to simulate games like soccer, hockey,

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to clarify
meaning

polo, which have more than one man on a team. And

then the next sentence says, when the display ball

or the puck is touched by one of the men on the

screen, it moves in the direction the man or the

spot on the screen was going when it hit the ball

or the puck. Then I said may be modified so the

ball would move away from the man that hit it like

a kicked ball or a passed puck, and I assume that

would mean that it would start moving quickly when

hit and then slow down somewhat as a kicked ball

might. And then this last thought was to allow the

player to just nudge the ball along rather slowly

like a hockey player moving the puck along on his

stick. to these various games and I suppose a

Q. Did you contemplate that anything would happen if

a player on one side hit the ball or puck causing it

to move toward a player on the other side and then

- the image of the ball and the player on the other side, coincided? into semantics. He can be stationary.
- A. I contemplated that then the same thing would happen, the opponent would gain control of the ball and that he could then hit it or kick it or move it along like a hockey player would.
- Q. So if I understand correctly, then, you did not contemplate that the ball would be moved by a player unless that player were activated by the operator? That is, a player's image being activated by an operator? tube or electronic goals.
- A. As I understand your question, unless that second player spot was moving? that you did not contemplate the opponent score electronically at least when the
- A. I don't know if I contemplated that detail or image not. The goal either on the screen or on the overlay?
- Q. This really doesn't say one way or the other, being does it? or the players could see that a goal had
- A. I don't think so other than I was trying to simulate these various games and I suppose all would hockey player who is standing still can still hit a puck that comes to him.
- Q. But if he does nothing, the puck if it hits him stops.

A. usually? by specific wording other than the intent

A. Well, we can get into semantics. He can be stationary and move his stick in as much detail as economics

Q. Well, whatever part that hits him, if it isn't

Q. moving, the puck stops? not with respect to all of

A. As I say, I don't recall that detail.

Q. Did you contemplate displaying any part of a

Q. playing area such as a hockey rink or soccer field?

A. I believe so. At least two goals; and by display,

A. that would include either an overlay in front of the cathode ray tube or electronic goals. to develop

Q. If it could have included an overlay or electronic goals, then it appears that you did not contemplate anything to occur electronically at least when the image of the ball or puck coincided with the image of the goal either on the screen or on the overlay?

A. On the overlay, I didn't contemplate much happening other than the players could see that a goal had been scored. With an electronic goal and coincidence circuitry, I possibly contemplated that a bell would ring or a red light would go on as in a real hockey game, for example. yes.

Q. Nothing like that is indicated here, though, is it?

- A. Not in any specific wording other than the intent of this would be to simulate the real games of what soccer, hockey, polo in as much detail as economics would permit. ~~am~~ to specifically cover that situation.
- Q. That was an overall intent with respect to all of these games? ~~ball~~ might stop in that it says that
- A. I think I would say that. ~~ached~~ to a man, it moves
- Q. That intent is not expressed, however, in the document, is it - is specifically? I guess the ball would go in
- A. No, I don't think so.. I probably should add that
- Q. maybe a secondary intent, the intent was to develop games that would be enjoyable enough to possibly be commercially successful and to that end in some of these items simulating a real game might make them do that. ~~e~~ of them was.
- Q. Still referring to the description of Game No. 18 on Exhibit 9-49, it states, "When displayed ball (puck, etc.) is touched by a man, it moves in sure direction man was going." ~~ca~~ Now, that contemplates the man must be moving in order to move the ball, does it not? ~~is~~ a copy of it in my hand here or I
- A. That sounds like it, yes. ~~it~~ 9-49 through 9-59, and
- Q. And there is nothing in this description, at least,

that would tell what happens or was intended to

Q. happen if the image of the man were not moving when the ball touched the man? bit 9-44?

A. It doesn't seem to specifically cover that situation.

Q. It might add you might imply that if a man wasn't

A. moving, the ball might stop in that it says that when displayed ball is touched by a man, it moves

Q. in direction man was going. So if the man was going in no direction, then I guess the ball would go in no direction and stop. spect to the exhibit?

Q. Were copies of Exhibit 9-44 through 9-50, or copies like that - I guess they would have been copies of Exhibits 9-51 through 9-63 - actually distributed to the distribution list so far, as you know?

A. Apparently one of them was.

Q. Which one is that? dy commenting on the memorandum

A. The one to R. Baer in Exhibit 9-44 to 9-50. I

A. assume the others were, but I don't know for sure.

Q. Why do you say the one apparently was delivered to Mr. Baer? discussed?

A. Because I hold a copy of it in my hand here or I

Q. hold the copy, this Exhibit 9-44 through 9-50, and, I would assume it got here today through Mr. Baer;

but I am not sure of that.

Q. Do you see Mr. Baer's name handwritten in the upper

Q. right-hand corner of Exhibit 9-44? with a pumping

A. Yes. and possibly the gun-shooting game, do you

Q. Are you familiar with his handwriting? you or that

A. Not to the extent of whether I could say whether he
had written this or not, no. 44 through 9-50 or

Q. After you prepared that exhibit, and it apparently

A. was distributed to the distribution list, did

Q. anything occur with respect to the exhibit? sure

A. I don't recall anything specifically happening at or
immediately after it was distributed. As time
passed, some of these games eventually were prior
implemented such as, for example, No. 18, the

A. soccer game. t.

Q. Do you recall anybody commenting on the memorandum

A. after it was distributed to them? not either very

A. I don't recall. I'd like to see the personnel records

Q. Was there a meeting held at which the various 11

games were discussed? the room on the 6th floor.

A. There might have been, but I don't recall. as

Q. You say sometime later Game No. 18 was implemented,
was this exhibit referred to at the time that that

Q. implementation took place? hat room?

A. I don't know if it was or if it wasn't.

Q. Other than the player pumping game with a pumping

A. lever and possibly the gun-shooting game, do you recall anything else that Mr. Baer told you or that you knew about having occurred prior to the time you prepared this Exhibit 9-44 through 9-50 or the original of it, that is?

A. I don't know.

Q. I believe you stated that you also were not sure whether you had seen any of the - seen any apparatus or entered the locked room on the 7th floor of Canal Street where the TV game work was done prior to the time you prepared this exhibit? regarding the

A. That is right.

Q. When did you first see any such apparatus? If, but

A. I don't know for sure; I would think either very

Q. near the date culled from the personnel records

A. or perhaps sometime before that when I physically

Q. moved to a desk up in the room on the 6th floor.

I may have been in the room and seen what was

going on there before that time, but I don't really

remember. I don't

Q. You had your own desk in that room? g me about then

A. Yes. if he did, I don't recall when he did. I do

Q. Did Mr. Harrison have his own desk? room, certain

A. Yes. ans of management coming in for demonstrations

and I remember that MR. WELSH: Let's take a

five-minute break. to see it. ...

Q. How do you remember it wasn't the first time? ...

(Whereupon, a recess

A. I believe Bill Harrison probably told me they had
was taken.)

been there before and it is quite possible that

Q. Between the time when you prepared the memorandum
which was the original of Exhibit 9-44 through

Q. 9-50, and the time when you moved to the locked station
room on the 6th floor to begin work with Mr. Baer,
did you have any contact with anyone regarding the
TV game project at Sanders?

A. I might have, possibly with Mr. Baer himself, but
I don't remember.

Q. You don't remember any specific instance? were you

A. No. on any briefing as to what had been done or what

Q. Do you recall his telling you about any demonstrations

A. to management which demonstrations occurred prior
to your going to work for him in July of 1967?

A. I believe such demonstrations took place, but I don't

recall Mr. Baer specifically telling me about them

Q. or if he did, I don't recall when he did. I do

recall after I was working in that room, certain

members of management coming in for demonstrations

A. and I remember that that wasn't the first time

they had come in to see it. least some and possibly

Q. How do you remember it wasn't the first time? to

A. I believe Bill Harrison probably told me they had

Q. been there before and it is quite possible that

A. Ralph told me. I don't really remember where I
gained the information.

Q. Was Mr. Harrison's telling you of prior demonstrations
the basis for your statement earlier that

A. demonstrations took place prior to your joining

Q. him in the TV game project? on demonstration?

A. I think so, but I am not sure where I gained that
Q. information. else there besides Mr. Baer or

Q. When you first went to work for Mr. Baer, were you

A. given any briefing as to what had been done or what

the status of the TV game project was? Mr. Baer,

A. Yes, I believe so. In addition to that, I could

A. pretty much see some of the things that had been

Q. done because the equipment and I were located in

the same room, after you went to work for him?

Q. Were you given a demonstration of apparatus that had been built prior to your going to work for Mr. Baer?

A. Yes, after I went to work for Mr. Baer, I was given a demonstration of at least some and possibly all of the games that had been implemented up to the time I joined his group.

Q. Who gave you the demonstration? I can recall

A. It was either Ralph or Bill Harrison or both of them at the same time.

Q. Was this shortly after you went to work for Mr. Baer?

A. I believe so.

Q. Was it sort of an orientation demonstration?

A. Yes, I suppose you could say that.

Q. Was anyone else there besides Mr. Baer or

A. Mr. Harrison?

A. I don't remember.

Q. From the time you started to work for Mr. Baer, did you work full time for him?

A. Yes, I think so.

Q. Was Mr. Harrison working full time in that room

in the period after you went to work for him?

A. I don't remember that.

Q. Did he work anywhere else after you went to work for Mr. Baer?

A. Yes. Let me qualify that, I believe he still reported in that department, but the specific work he was involved in at times was done for other departments as part of the functional nature of the electronic design department and I can recall sometimes his being called, I believe, down to the second floor occasionally to help on projects at there. He still officially reported to the same group.

Q. So that sometimes when you were working in that sixth floor room, he was not there?

A. I believe that is correct.

Q. Was he there most of the time?

A. Over this total period when I worked in that group?

Q. When you were working on the TV games.

A. I would say yes.

Q. Did you see MR. WELSH: Why don't we break

A. for lunch now.

have been one that. (Whereupon, the luncheon and
I don't remember. recess was taken.) It more

Q. (By Mr. Welsh) Would you please describe, to the
best of your recollection, what was demonstrated to
you at that first demonstration of TV games after
you went to work with Mr. Baer?

A. Let's see, as I recall, there was the rifle-shooting
game which involved the use of a photocell inside
the rifle barrel with at least one square light
spot on the CRT face, television face. And I believe
the spot disappeared when you hit it. I think at
that time there was provision for generating three
square spots. These spots could be made to move
by turning the shaft of a potentiometer in that
they moved while you were turning the shaft. It was
more of a positioning mechanism for them. That is
about all I remember, although there may have been
other games which I can't remember. spot around

Q. You mentioned earlier a pumping game that you

A. thought Mr. Baer described to you? I also seem to

A. Yes. It was a game involving two players. One player

Q. Did you see such a game at that demonstration?

A. I don't remember seeing that, no, I think it may be

have been one that had been developed earlier and I don't remember seeing it. I remember it more by being told about it.

Q. Were you shown any of the circuitry by which the games demonstrated were carried out at that demonstration?

A. I think so. If not right at the demonstration, then sometime thereafter while I was working in the room with Bill Harrison.

Q. You say you recall provision for generating three square spots which would be made to move by turning the shaft of a potentiometer; you mean three spots would be moved by turning the shaft of a single potentiometer?

A. No, there would be three separate potentiometers.

Q. And I am not sure that there were three spots at the time, I am quite sure there was at least one.

Q. Was any game played by moving the one spot around that you are sure you do recall?

A. The rifle-shooting game was, yes. I also seem to recall a game involving two spots where one player would move one spot with a potentiometer, another player would more or less chase the other player by

moving his spot with a potentiometer and I believe the pursued spot disappeared when coincidence occurred or when two spots touched or hit each other.

Q. Do you recall anything else happening upon one spot hitting another spot?

A. I vaguely remember the background color on the TV set being changed.

Q. And was that color changed in response to something?

A. I believe it was when the two dots hit each other.

Q. Were the games as they were demonstrated to you given any names?

A. I don't remember. I think the one I referred to as the rifle game might have been referred to as just that.

Q. Were any overlays used in the demonstration?

A. I don't remember.

Q. Do you recall any chess game being played?

A. No.

Q. Was any game demonstrated to you called a fox hunt?

A. It may have been, but I don't remember specifically.

Q. How about fox and hounds chase?

A. I don't remember these specifically.

A. Even though I don't know what those words mean,
Q. I assume it would possibly involve one or several
A. dots chasing another and that there would be
variations on that type of game. I may have been
shown them; I don't remember.

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Q.. Do you remember a game of filling a bucket? later;

A. I remember hearing of that one; I don't remember

A. whether I saw it or not. about it at that time.

Q.. And still referring to the first demonstration,

A. do you recall any game called fire fighter's game?

A. No., in one of these notebooks, Exhibit 17; that

Q. When you first went to work for Mr. Baer, were you
C. given any specific assignment with respect to

A. TV games? July 10, wherever, that I apparently

A. I think yes, an assignment to help think up more
new and different games.

Q. Were you assigned to work with anybody in this
regard? September 26, page 95?

A. Not formally other than I was in the room with
Bill Harrison and I talked with him and with Ralph,
all of us were trying to improve our position in
this field. e to ask if you would do that starting

Q. Were you given that assignment immediately? to work

A. I think so... and see if you can find any other

Q. Do you recall specifically? games?

A. I think that was my main assignment along with, as I said before, thinking of other type commercial ideas or products.

Q. Did you go to work on that assignment immediately; that is, upon joining Mr. Baer? that period from

A. I certainly began thinking about it at that time.

Q. Did you work on it full time? a subject, possibly

A. I would say almost full time in view of what we saw in one of these notebooks, Exhibit 17; that after this July 7 date - I - couldn't know where

Q. I believe it was July 10. I may have written

A. All right; July 10, whenever, that I apparently did enter in my notebook some other ideas which

Q. did not involve TV games. as, an official I R & D

Q. And your first TV game entry was September 28,

A. I believe? September 25, page 95?

A. There is an entry on that page; as I said last week, without perusing every page of this exhibit, I don't know if that is the first one.

Q. I would like to ask if you would do that starting with the entries in July after you started to work

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for Mr. Baer and see if you can find any other reference to your work on TV games?

A. It does indeed appear that the first entry in Exhibit 17 involving TV games is on page 95 dated September 25, 1967.

Q. Did you keep any other records of your work on TV games or anything else during that period from the first part of July through September of '67?

A. I may have written memos on the subject, possibly I might have written some of the work on pads or

looseleaf notebooks, but, if I did, unless they are in the exhibits here, I wouldn't know where they are after nine years. I may have written

memos to our I R & D Department in the form of progress reports, things like that.

Q. Was development of TV games, an official I R & D project, do you recall?

A. I believe it was.

Q. Do you recall whether that was a project in existence at the time when you joined Mr. Baer or whether it

occurred at a later time? in Mr. Baer's group.

A. I believe it was in existence, do you know?

Q. Do you recall whether additional funding for the

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project was sought after you started working on
TV games?

A. I don't recall.

Q. Do you recall whether you had anything to do with
obtaining funding for the games?

A. I believe written progress reports, perhaps memos
outlining plans for future work, possibly even
formal I R & D requests. I don't remember whether
this was done or if I did it or if Ralph Baer
took care of that aspect of it.

Q. Do you recall the appearance of the apparatus which
was demonstrated to you at that first demonstration
after you started to work on TV games?

A. I vaguely recall, I think it was a toy plastic
rifle used in the rifle-shooting game. I think
it was demonstrated on either an Admiral or an
RCA colored TV set, probably the latter.

Q. Have you seen the apparatus since that time?

A. Yes.

Q. Under what circumstances?

A. During the time I worked in Mr. Baer's group.

Q. Was the apparatus kept intact, do you know?

A. Not during all that time. In fact, I think that is

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possibly why I can't remember seeing some of these earlier games. I think it was the sort of thing that a breadboard circuit might be made for one specific game and then it would possibly be set aside and as new circuitry was called for, a new breadboard would be constructed.

Q. I show you what has previously been marked as Exhibit 28 and ask if you would examine that and tell us if you recognize it?

A. Whereas we are here in the context of this meeting, I would say yes this looks like probably this pumping game with this wooden lever, but I don't really recall this particular box. That is not to say that I haven't seen it years ago.

Q. You don't have any specific recollection of the apparatus?

A. Not really any more than I would the details of a television set that I might have watched Wyatt Earp on TV nine years ago. This is quite probably the device that generated spots and things like that. I have seen a lot of breadboards in my experience since I got out of college and one doesn't look an awful lot different from the other, except

this wooden lever does make this unique, and makes me believe that this is the pumping game or at least part of this must be the pumping game.

Q. I believe you stated you didn't recall whether that was in the first demonstration that you saw?

A. Right. I do believe it existed and I remember hearing about it; I don't remember whether I actually saw that particular game demonstrated. It is quite possible that by the time I got on the scene,

that whatever games this box generates had been that considered done and that new circuitry was being developed, I am not sure.

Q. Do you have any recollection of this Exhibit 28 in connection with the first demonstration other than possibly the pumping lever?

A. Not really. It is possible that these breadboards I see inside this might have been on a bench performing their functions and not in this box or the case at that time, but I don't really remember.

Q. Are any of the breadboards familiar to you?

A. No more than any other breadboards I have seen as long ago as I probably saw these.

Q. Can you tell from examining any of those with meters

respect to TV games as to when; that is, the

A. TV games of Sanders, as to when they were constructed?

A. Not really. . . with Mr. Baer, on TV games,

Q. Can you tell from examining them as to what point in the development of TV games they occurred?

A. Only from the fact that I associate this wooden lever on the top of the box with that pumping game

A. which I do believe was in existence prior to my joining Mr. Baer in July of 1967. . . .

Q. I believe you stated that in the demonstration that was first shown to you, that each spot could be moved by an operator manipulating a potentiometer?

A. I think that was the case.

Q. Was there only one potentiometer available for moving each spot? . . . the source of the project.

A. In retrospect, I guess there must have been two, one to move the spot horizontally and one to move

A. it vertically. . . I don't think we had joy stick controls at the time, but we may have. By joy stick,

A. I mean where one shaft can be used to move the spot horizontally or vertically or both at the same time.

Q. With a joy stick, there were still two potentiometers

were there not?

A. Yes, connected mechanically to the joy stick.

Q. In your working with Mr. Harrison on TV games, did you have occasion to observe whether he kept any notes with respect to the work? and at other

A. Yes, I believe he did. down at his desk where it

Q. How did he keep his notes? to write. The work bench.

A. I believe he used laboratory notebooks, but I am quite sure - I know he wrote down schematics on

Q. pieces of paper at least. that you sat on at the

Q. Do you mean he made entries in notebooks or in a

A. notebook and on separate pieces of paper at the same time? the work bench.

A. I don't know if it was at the same time, but I think he did both during the course of the project.

Q. You say you think he did both, do you have any

A. specific recollection? ically; I assume he did being

A. It can remember seeing schematics on separate pieces of paper. I can vaguely remember some of them

Q. getting scotch-taped into notebooks. entries of

Q. Did he keep the notebooks on a work bench or at his

A. desk? ally.

A. Yes. you have any personal knowledge of that?

- Q. In both places? I would assume Mr. Baer would have
- A. I don't remember which. I don't really remember.
- Q. I would assume I vaguely remember he probably left a notebook lying on the work bench if he the was over there working on circuits and at other times I imagine he sat down at his desk where it would probably be easier to write. The work bench was high and probably not conducive to a lot of writing. I think he spent considerable time at night
- Q. Well, did you have stools that you sat on at the work bench? It is during the day in connection with
- A. If I remember, there was at least one rather high stool near the work bench. He would stop in
- Q. Did Mr. Harrison ever ask you to witness any diagrams that he prepared or any of the entries in his notebooks? and give us any new ideas he might
- A. I don't recall specifically; I assume he did being that I was aware of what he was doing and working on the same project.
- Q. Did anybody else witness notebook entries of Mr. Harrison? of each day during that period
- A. Probably. First part of July until the end of
- Q. Do you have any personal knowledge of that? 6th floor

A. I don't recall. I would assume Mr. Baer would have witnessed some of the pages. all the work I had

Q. Approximately what percentage of the time would you estimate that you and Mr. Baer worked on the

Q. TV game project from the time you joined Mr. Baer until, say, the end of September of '67?

A. I don't really recall as far as Ralph was concerned;

Q. I don't think this was a full-time thing with

A. him. I think he spent considerable time at night thinking about it, but he also had many other

responsibilities during the day in connection with

running a department at Sanders, so I don't think

he devoted full time to this, he would stop in

Q. probably once a day, a few times a day or every

other day and talk with Bill Harrison and me about

what was going on and give us any new ideas he might have. some of what had been done on TV games. In

Q. Did you ever see him read Mr. Harrison's notebook entries and sign them?

A. I don't remember. or in a notebook. I don't think

Q. What percentage of each day during that period from the first part of July until the end of

Q. September did you spend in that room on the 6th floor?

A. I believe almost the full working day. As far as I remember, I had cleaned up all the work I had done with my previous assignment and I think I was working full time.

Q. And how much time did Mr. Harrison spend during that same period in that room?

A. Up through September?

Q. The end of September of '67.

A. I think it was full time. As I say, I know through the whole period of our being in that room, he was called occasionally to work on other projects part time. I think in those early stages, he was full time on the TV game project.

Q. You stated that you were shown certain diagrams of what had been done either at the time of the demonstration or shortly thereafter; that is, diagrams of what had been done on TV games. In what form were those diagrams?

A. I believe they were hand drawn schematics either on pieces of paper or in a notebook. I don't think at that time there were any fancy schematics done by draftsmen.

Q. I now hand you what have been marked previously as

exhibits and ask if you would look at each of them and state whether you recall any of these as having been shown to you around the time of the demonstration or shortly thereafter? And these are Exhibits 9-73

through 9-88. After seeing these exact documents,

Could I have that question back again? I only recognized them as being associated with TV games, but that

(Whereupon, the previous question was read back I saw these exact pieces of paper at that time or by the reporter.)

not. What I do see on some of these fits in with some of my memories. THE WITNESS: I don't there specifically recall seeing these at that time, receiver but it is quite possible that I did. There is an Item 8 of Exhibit 9-87 which brings back memories of this pumping game which I had at least heard of or had seen demonstrated. Things like this windmill and straw on Exhibit 9-88, I don't but I specifically remember. Whether I saw these exact

So the only thing out of all of those items that you have any recollection about is Item No. 8 on Exhibit 9-87? familiar with the circuitry for

producing a monochrome MR. WILLIAMS: Well, that is not the question you asked before. The question

A. you asked before was whether he had seen these documents at that demonstration, so I don't think you are summarizing his testimony accurately.

Q. The answer was you had no specific recollection?

A. I don't remember seeing these exact documents,

but I may have. At this time, I naturally recognized them as being associated with TV games, but that was a long time ago and I don't remember whether

I saw these exact pieces of paper at that time or

not. What I do see on some of these fits in with some of my memories. For instance, on 9-77 there

is mention made of an RCA Model CTC 12 color receiver which I remember as quite probably being the set

we were working with. And I see horizontal DMV, which would be delay multivibrator; vertical DMV

and a statement below that diagram saying the above should produce the monochrome square, but I

still don't remember whether I saw these exact papers before or not.

Q. Referring to Exhibit 9-77 that you just referred

to, were you familiar with the circuitry for producing a monochrome square that was used at the demonstration?

A. Probably not. I think I was shown the results first and then in the course of working with Mr. Baer and Mr. Harrison was brought up to date on the circuitry that then existed.

Q. This was shortly after the first demonstration?

A. Probably. Perhaps not all of them.

Q. But, in any event, you were made familiar with the circuitry that was used in the demonstration?

A. I believe so.

Q. Could you refer to these exhibits and tell me if any of them show all or part of that circuitry?

MR. WILLIAMS: Do you mean

the exhibits that you referred to a minute ago and handed to the witness?

MR. WELSH: Yes, the ones he

still has.

THE WITNESS: I would say

yes.

Q. Would you point out those exhibits and the part of them that show such circuitry?

A. One specific one I referred to before, 9-77. It says added circuitry required to produce the target-shooting game within the TV set. I'd have

to stop and figure it all out again, but I would assume these blocks showing the horizontal and vertical delay multivibrators, pulse shapers, etc., did that job. So certainly I think these reflect at least in part some of the circuits that were involved, perhaps not all of them.

Q. And you are referring to the block diagrams at both the top and bottom of Exhibit 9-77?

A. Well, the one at the bottom says for chroma color change when hit is made and that, I assume, is a block diagram of the method that was used to change the color of the TV screen as I mentioned I had seen in one of those first demonstrations.

Q. And did you become familiar with such a method at least after the demonstration?

A. Moderately so, perhaps not in all aspects of every circuit.

Q. Does this block diagram appear to reflect the method, as you recall it?

A. I would think so, but I am not sure.

Q. You didn't find any other circuits among these exhibits that reflects the circuitry as you became familiar with it; that is, the circuitry that was

in the apparatus used in the first demonstration you saw?

A. Well, there is another exhibit, 9-79 which says complete remote unit necessary to produce target game. That is dated 6-15-67. And I believe that was about the method in use at the time. I notice it has a reset button at the bottom of that diagram and I vaguely remember after you hit the spot and it disappeared, being able to push a button on the gun, I believe. Perhaps on the breadboard circuitry somewhere, and the spot would reappear.

Q. How about Exhibit 9-81, does that include any of the circuitry of the apparatus demonstrated to you as you became familiar with that apparatus?

A. It appears that it does. It says horizontal oscillator, vertical oscillator, which I assume delivered the sync. signals to the TV set. There is a small circuit in the lower right-hand corner of that exhibit which looks like some sort of an RF driver which it says is connected to the TV antenna terminal, which appears to be part of the equipment existing at that time.

Q. And how about the schematics on 9-82?

A. They would appear to be associated with this same subject, yes. collection, that is how spots were

Q. Do you know what the lower schematic is? by varying

A. I don't know for sure, I would assume whereas the top one says horizontal oscillator and sync., that the lower one might be vertical oscillator and sync. As the values of the components are different from this one than the top one and it is quite all, possible that the person that did this might just not have labeled the bottom one. be?

Q. How about the circuit diagram on Exhibit 9-86?

A. That too in the context of why we are here today appears to be part of the circuitry. I see at the upper right of that exhibit it says pulse stretcher. I vaguely remember Bill Harrison stretching pulses for some aspect of this device. I forget rightness now just what it was for. That jogs my memory somewhat seeing that pulse stretcher label. I might add that several of these figures do tie in with my recollection of how the spots were generated and moved at the time I joined the project.

Q. Which of those do that?

A. For instance, Exhibit 9-75, that exhibit appears

to show a delayed pulse, delayed in time by T_d ; and, to my recollection, that is how spots were generated at that time. They were moved by varying this delay time from the start of your horizontal and/or vertical sweeps. That would tie in with Exhibit 9-79 and 9-77 which show horizontal and vertical delay multivibrators.

Q. I refer you now to Exhibit 16 and ask, first of all, if you recognize the exhibit and, if so, would you tell us what you recognize it to be?

A. Well, it says Sanders Associates, Incorporated, the Electronic Countermeasures Division, engineer's notebook. It says William Harrison on the front of the inside cover. I would assume it was a notebook listing work, the early work of this TV project. I see a date on page 1 of 1 September, '66, witnessed by R. H. Baer, so I would assume this would have been one of Bill Harrison's notebooks.

Q. Do you recall seeing that in the 6th floor TV game room while you were working there?

A. I don't recall it specifically. It definitely may have been there.

Q. Is that similar to the type of Sanders notebook

that you kept? on vertical sync.; and, on page 70, 812

A. No. Well, yes and no. one for horizontal and

Q. Have you had notebooks like this one; that is,

Exhibit 16? thing 37 11/2 is the same as page 46,

A. No, not with this hard blue cover from the ECM, ead.
or Electronic Countermeasures Division, most of 46
the ones I have used have been like Exhibit 17. tor.

Q. 17 and 18 which were your notebooks, is thatly. The
correct? defined as going via twin lead to TV

A. Yes. The softer brown cover notebook with yellow
pages as opposed to this hard blue cover one with
white pages. a TV set through the antenna terminals.

Q. Now, I'd like to ask you to examine pages 68 through
83 of Exhibit 16 and tell me if there are any one
circuits on these pages that you recognize through
your familiarization with the circuitry that was
demonstrated to you as having been included in that
circuitry? And, if so, would you point it out; the
to us? in the lower, left portion within a dotted

A. On page 68 there is a circuit which apparently

A. was an attempt to generate sync. signals for use

with a TV set. It says at the top, horizontal

oscillator and sync. On page 69, it appears to be

an oscillator for vertical sync.; and, on page 70, ^{with 5/2/76} the delay multivibrators for horizontal and vertical delay. I see a note at the bottom of page 70 stating RF link is the same as page 46, which I now refer to, except the following changes. That latter was written on page 70. And on page 46 I see a circuit diagram labeled Colpits oscillator. It says that it appears to work satisfactorily. The output is defined as going via twin lead to TV antenna terminals VHF, so this would appear to be the method used at that time for getting all these signals into a TV set through the antenna terminals. The plain piece of paper marked Exhibit 16-71A indeed appears to be a method for generating at least one spot, perhaps two, on a TV set. I see pulse shaper and coincidence gate called out on that exhibit.

Q. There are two dot generators on that exhibit, are there not? One in the center, top portion and the other in the lower, left portion within a dotted outline?

A. I would believe that that is correct. On page 71 at the bottom appears to be the method for the target-shooting game involving a light sensor or

photocell. I see the reset button which I have previously mentioned I remember being associated with that game and I see a note and it says the target disappears when hit is made, so I would identify this as being part of the target-shooting game at that time. The page is dated 7-7-67.

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MR. WELSH: This may be a good time to take a break.

(Whereupon, a recess

was taken.)

Q. Would you now please go on starting at page 72 and going on to page 83 of Exhibit 16 and noting any circuitry which from your familiarization after you witnessed the demonstration you believe to have been in the apparatus demonstrated to you when you first went to work for Ralph Baer?

A. Page 72 appears to be more work involving the guns and the photocell for the target-shooting game. Page 73 appears to be work on a power supply to "generate 9 volts DC at approximately 50 milliamps" quite probably for use with the TV circuitry.

Q. Did the circuitry that you were familiarized with

include such a power supply?

A. I believe so. Page 74 appears to be more work in concern with the horizontal and vertical sync oscillators and on the bottom of that page delay multivibrators. I see a coincidence gate at the bottom of page 75.

Q. Was there a coincidence gate in the circuitry that was used in the demonstration as you became familiar with that circuitry?

A. At least in so far as the target-shooting game was concerned. Well, let me think about that, I am not sure. I forget just how the target-shooting was implemented, whether that would involve a coincidence gate. It probably did not involve such a gate.

Q. When you use the term "coincidence gate," what do you mean?

A. I am thinking more in terms of again when two spots touch each other on a screen or overlap or if a spot hits or touches any other designated area, that is more what I think of as coincidence.

Q. Had you ever heard an and gate referred to as a coincidence gate?

A. I may have; I don't remember.

Q. I refer to the bottom of page 75 in the left-hand portion of that schematic appears the legend to horizontal DMV output and to vertical DMV output, is that correct?

A. That is what it says, yes.

Q. If you were dealing with the coincidence of two spots, that legend would be inaccurate, would it not?

inaccurate?

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A. I don't know if it would be inadequate or if possibly two such circuits would be used, I guess in the case of if two circuits were used, the horizontal from both spots would go to one circuit and the vertical from the two spots would go to the other circuit.

Q. May I refer you back to the sheet attached to page 71 of Exhibit 16 and the legend in the upper right-hand corner pulse shaper and coincidence gate. Now, there the term coincidence gate is used with a dot generator, is it not?

A. Yes, I believe you are right.

Q. In other words, horizontal DMV No. 1 and vertical DMV No. 2 together with the pulse shaper and coincidence gate constitute a dot generator, do

they not?iller. At the upper right-hand corner)

A. A square dot, I believe that is right. TV antenna

Q. So the term coincidence gate as used at the bottom of page 75, in view of the legend to horizontal the DMV output and to vertical DMV output, probably was a coincidence or and gate with respect to a dot resistor generator?istor and the two diodes at its base appear

A. I believe you are absolutely right. page 75 which

Q. Could you go on then? as a way of generating a

A. I don't think I covered yet the top of page 75 which again appears to be a schematic for a sync. its oscillator and a delay multivibrator with a note and that updated complete schematic is attached to page 76. I will now examine Exhibit 16-76A. It.

Q. Is there just one sheet attached to that? of the

A. There is A and B.

A. Yes. The one that be MR. WELSH: Off the record.

be the slower vertical sync. circuit with its
(Discussion off the record.)
delay multivibrator. These two circuits appear

similar to that shown THE WITNESS: In Exhibit 16-76A, first I do see plus 9 volt source voltage or the supply voltage appearing in several places which is consistent with the 9-volt power supply development

we saw earlier. At the upper right-hand corner I see an arrow stating TV lead-in wire to TV antenna terminals which appears to be the output of this circuitry for generating something on the face of the TV screen. There is a point marked which goes through a 3.9K resistor to a collector of a 2N 4275 transistor. That transistor and the two diodes at its base appear to be the coincidence gate shown on page 75 which we have just decided was a way of generating a square spot. Preceding the diodes in the upper left appears to be one of the sync. circuits and its associated delay multivibrator. This is probably the horizontal sync. circuit since the capacitor values are smaller than the other sync. circuit.

Q. That is the one in the upper left portion of the exhibit?

A. Yes. The one just below that one would appear to be the slower vertical sync. circuit with its delay multivibrator. These two circuits appear similar to that shown on page 75. It would appear that the lower portion of Exhibit 16-76A would be the means for generating a second spot and I would think that the variable 100K potentiometer and the

variable 1 Megohm potentiometer would be used for positioning that spot. I see a second variable 100K pot to the right of that portion of the figure and I don't really recall what that was for. The lower right-hand corner of the figure seems to show a power supply which apparently delivered 7.8 volts DC and probably it would be attached to the points calling for plus 9 volts. Above the power supply appears to be the photocell and reset circuitry associated with the target-shooting game. Now,

Exhibit 16-76B appears to be a modified copy of the previous exhibit. For some reason, the power

supply portion is crossed out. The photocell reset target-shooting functions appear to be crossed out.

Several components seem to have been added and/or changed in the upper sync. circuit. There is an

addition down in the lower middle portion of that

exhibit which appears to be at least a partial update of the reset function under the circled D.

It appears to be a reset button, not labeled.

Q. And is there a date of that updating next to the word "updated"?

A. There is, but it is just a copy of the word "updated"

which was on the original exhibit, 16-76A, but I

Q. What was the date of the original exhibit?

A. 7-13-67. In fact, that small middle circuit does also show a photocell appearing as a circle resistor ^d wfr 5/25/76

Q. in the left-hand portion. Not some changes to the

Q. Can you determine from Exhibit 16-76A whether there

A. is any circuitry provided for detecting coincidence of the two dots? I believe that the lower left corner was a dot generator which would be for a second dot and the central portion of the upper part of the drawing would be a generator for the first dot? collector resistor from 10K to a 1K and

A. I don't see any coincidence circuitry that would, for example, give an electrical signal when two dots touched or overlapped. In that on Exhibit 16-76

Q. Could you go on with the next page, 77 and the following pages up to page 83? to the gun photocell

A. Page 77 seems to be a record of more work involving photocells and associated circuitry concerned with the target-shooting game. Page 78 in the portion above the horizontal line appears to be the same thing or a continuation thereof. The bottom of that page seems to discuss coincidence gating. It says

that the schematic was updated on page 76, but I don't see that. On page 76 the crossed-out portion does say a circuit is shown in schematic attached to this page. page 73 brings back some memories to

Q. On page 16-76B are there not some changes to the resistors connected to the Point D? It says a

A. Yes, and it appears that penciled in above the old values are the values 2K; however, on the original of that diagram which is Exhibit 16-76A, those resistors show as a 1K and a 3.9K; and the text on page 78 at the bottom under coincidence gate says, "changed collector resistor from 10K to a 1K and 3.5K, the junction of which the SCR is connected to make spot disappear." All right; that would be for the target-shooting game in that on Exhibit 16-76A, that junction which is D with a circle around it goes to the reset button connected to the gun photocell circuitry. It does appear that we may have three definitions of coincidence. The first, coincidence of horizontal and vertical bars to generate a square spot; this second definition on page 78, which appears to be a method of knowing when the gun with its photocell has "hit" a spot on the screen; and then

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the third definition which I used earlier when a spot hit another spot or other designated area on the screen, it generates some kind of an electrical signal. Now, page 79 brings back some memories to me which indicates this is indeed a record of work that had been done on this project. It says a generator was connected to the Heath TV model in a darkroom environment. I recall Bill Harrison telling me that somewhere in the early stages of development on this project, they attempted to use a Heath generator to generate horizontal and vertical sync pulses. Page 79 appears to be more work on the target-shooting game to increase performance. At the top of page 80 appears to be comments continuing that work, *an* attempt apparently being made to get consistent results with the rifle at various distances from the screen. In fact, about two-thirds of that page appears to concentrate on that same subject. The lower portion of that page appears to be some data concerning how much current is drawn at various voltages. On page 81 there is the underlined phrase, engineering model. It says an engineering model is now being constructed for use

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by individuals concerned with the feasibility of
this generator. The date on that page is 7-28-67.
It says the engineering model is being housed in
a 6-inch by 8-inch minibox demonstrating plug-ins
for circuits concerned with intermittent duty
determined by functions needed for particular games
and permanent installation of circuits such as
the horizontal and vertical oscillator and RF section
which appear to have 100 percent time usage. The
bottom of page 81, some work involving the horizontal
oscillator. It appears from the text written here
that the oscillator frequency changed when the
delay multivibrator cards were plugged in. I assume
that means plugged into their engineering model
being developed. Now, referring to Exhibit 16-82A
attached to page 82, I see a piece of paper labeled
TVG 8-2-67, W. Harrison. This would appear to be
the circuitry that was being developed for
installation in the previously referred to engineering
model. I see pieces of circuitry enclosed in dashed
lines. The horizontal and vertical delay
multivibrators labeled "plug-in cards." Apparently
the previously referred to permanent circuitry in

that model would include the horizontal oscillator and vertical oscillator shown in this exhibit,

Along with the AM modulator and RF oscillator which

appears in the upper right-hand corner of the exhibit. Again the photocell and reset button

functions of the target-shooting game are shown

in the lower right-hand corner along with a push-button trigger switch which would activate when

the gun's trigger was pulled. I do remember Bill Harrison working on that trigger switch or the installing it and getting it to work properly.

Q. Is that the first time that appears?

A. I believe so. There is a switch shown in the same portion of the circuitry on page 79, but I can't really tell whether that was connected to the trigger at that time or not. Quite possibly it

was. I see a note on that page 79 saying microswitch wrapped with tin foil for shielding. Quite possibly from radiated energy from fluorescent lights and various pieces of equipment in the building. Also

the same switch is shown on page 78 again with a note, "wrap some tin foil around trigger switch", etc.

Q. Page 77 shows the switch in a similar location with

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trig. sw. by it, doesn't it? photocells, Mr. Wells.

A. Yes, trigger switch. Indeed the same switch is shown back on Exhibit 16-76A and also on page 71.

Q. I think that is sufficient; I hadn't recalled your mentioning that before.

A. I hadn't really seen it or it didn't register.

Q. Now, do pages 83, 84 and 85 also relate to the evolved target game?

A. I will look, I haven't done 82 yet. I did the attachment to 82. Let me just check page 82. The

top of that page seems to involve checking the feasibility of using a battery to power the

engineering model instead of a power supply. It says battery life test on engineering model No. 1

schematic attached to this page. And on that schematic which is Exhibit 16-82A, battery is

shown providing the 9-volt power. The rest of

page 82 apparently is just life test information on batteries to power the engineering model.

Now, referring to page 83, this section labeled "target game" does seem to continue with work involving

the photocell, trigger switch, reset button and associated circuitry. The bottom of that page

A. appears to be measurements of photocells. Mr. Welsh, now how many more pages did you want considered?

Q. Well, I had thought to stop at 83, but I see 84 and 85 are continuations of 83's measurements; I

A. Page 84 appears to be the continuation of work to improve the target-shooting function. Page 85 just has a few comments about the circuitry involved in the target-shooting game, saying that it is very usable without critical threshold adjustment out to 8 to 10 feet from TV screen. All amount of it

Q. Did you do anything with Mr. Harrison with respect to the target-shooting game and the notebook

Q. entries involving that game that we have just been going through? particular horizontal and vertical

A. I may have offered helpful comments to him while he was working on this. I certainly haven't seen anything in this particular notebook that I entered and I don't remember whether I did or did not enter material on this project in another notebook or on paper.

Q. Well, other than offering helpful hints, did you participate in his work noted on these pages? For example, in the various measurements that he made; did you participate in those? 16-71A, for example.

A. I may have, but I don't remember. I may have, for example, held the gun at various distances from the TV screen while he made measurements or he may have held the gun and I made measurements; I don't recall.

Q. (Hereupon, the previous question was read back to him by the reporter.) You don't recall whether you specifically assisted him or worked with him in this work set forth in pages 68 through 85 of Exhibit 16?

A. I remember the work going on; I believe I was in that room at the time a considerable amount of it was being done. I don't recall whether I helped much or if at all on it, is that not?

Q. Did your participation in the TV game project have to do with this particular horizontal and vertical oscillator and DMV circuits for dot generation?

MR. WILLIAMS: Well, I object to the question. The question appears to be vague. There are at least two different circuits referred to on the documents 16-68 through 85; are you referring to any particular one of those circuits?

MR. WELSH: Well, any of these horizontal and vertical DMV circuits for dot generation. You can refer to 16-71A, for example.

Q. Do you understand the question?

THE WITNESS: Repeat it once, please? I did understand it, now I have forgotten it.

A. Not vividly and lucidly, although it's correct,
(Whereupon, the previous question was read back several times a week, sometimes several times a day, and in this particular example probably talking to Bill Harrison about)

THE WITNESS: I would say not primarily. Ralph talked to him, whether progress

Q. These had been pretty well developed by the time you joined the group, had they not?

A. Yes, these particular ones, spending a substantial

Q. Yes, the ones that are set forth here in these pages that we have been talking about, 68 through

A. 85, I think so.

A. Yes, sir.

Q. So that this work that Mr. Harrison makes reference to was primarily being done by him with perhaps

A. an occasional assist by you, would that be a fair representation?

A. I would say yes, and under the supervision or cognizance of Mr. Baer.

Q. Do you have a specific recollection of Mr. Baer working on improving the target game during this time which is shortly after you joined the TV game group?

A. Not vividly and lucidly, although the project, as I say, I can remember him coming in at least several times a week, sometimes several times a day, and in this particular example probably talking to Bill Harrison about what he had done since the last time Ralph talked to him, whether progress was being made or not, what technical problems were confronting him.

Q. Do you recall Mr. Harrison spending a substantial amount of time on the TV target game improvement shortly after you came onto the scene?

A. Yes, I think so.

Q. And did you participate in that other, than on a more or less casual basis, perhaps answering questions occasionally?

A. Probably not.

Q. Was any other work on the TV game project going on the same time that Mr. Harrison was working on the target part of it?

A. I don't know. It is possible that at that time I personally was thinking about new and different games and different methods of implementation, but I don't as of now in the exhibits see the record of this.

Q. Now, we did refer to your notebook, Exhibit 17, I believe, and during that same period of July 7, starting on page 47, and up through July, at least that would go up to page 60 of that book, there are considerable entries, are there not, with respect to your work on the guitar?

A. What page are we starting with?

Q. 47 through 60.

A. Page 47 seems to be work for a frequency doubling guitar pickup which happens to be a different project from the halving circuit that I described earlier, but still related to guitars, yes. I would say those pages list thoughts not exclusively related to the guitar, but apparently not related to TV games either.

Q. From that, would it be fair to conclude that while Mr. Harrison was working on the improvements to the TV game, specifically the target part of it, you

* Corrected to extent
covered by NOTE in Depo. 8, p. 47

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might have been or were working on something else
such as the guitar pickup?

A. I would say it depends on how complete this notebook
is. I don't think the records in these pages would
indicate my full time work during those weeks. As
I say, it is quite possible and probable that whereas
I was in that room and close to this TV project,
that I was giving some thought at least, which
possibly didn't lead to anything earth-shaking enough
for me to write down at that time.

Q. But you were working on this other project also?

A. Yes.

MR. WELSH: All right; I think
that is a good place to stop for today.

(Whereupon, the deposition in the above-entitled
matter was adjourned at 4:35 p.m.)

William T. Rusch *
Deponent 5/28/76

THE STATE OF NEW HAMPSHIRE)
COUNTY OF Hillsborough) SS.

Subscribed and sworn to before me this 28
day of May 19 76.

VIRGINIA J. MURPHY, Notary Public

Virginia J. Murphy

my Commission Expires September 26, 1979

Justice of the Peace and/or
Notary Public